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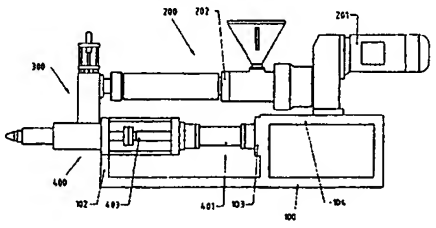
[54]实用新型名称 连续塑化注射成型装置

[57]摘要

本实用新型涉及一种注塑装置，尤其是一种将塑料原料连续挤压塑化熔融并将其注入到闭合模腔的注射成型装置。它包括机座、预塑装置、单向阀和注入装置，预塑装置包括带加热结构的塑化筒、塑化螺杆和驱动装置，注入装置包括带加热结构的注入筒、注入芯棒和驱动装置，所述塑化筒与单向阀之间还设有一变容暂存装置，单向阀设在变容暂存装置与注入筒之间。本实用新型结构简单合理，塑化质量好，生产效率高，控制方便且精度高，加工范围大，熔料在容料筒及注入筒内不易滞留。



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1、一种连续塑化注射成型装置，包括机座、预塑装置、单向阀和注入装置，预塑装置包括带加热结构的塑化筒、塑化螺杆和驱动装置，注入装置包括带加热结构的注入筒、注入芯棒和驱动装置，其特征在于：所述塑化筒与单向阀之间还设有一变容暂存装置，单向阀设在变容暂存装置与注入筒之间。

2、根据权利要求 1 所述的连续塑化注射成型装置，其特征在于：所述变容暂存装置包括容料筒、导流芯棒、环状容积调节活塞、活塞杆、联接板和弹性蓄能器，导流芯棒位于容料筒内，导流芯棒内有一导流通道，导流通道的进口通过容料筒侧壁的进口与塑化筒相连通，导流通道的出口与容料筒的容料腔相连，容料腔通过容料筒的出口与单向阀相通，容积调节活塞可滑移地套在导流芯棒的出口端，并与导流芯棒及容料筒液密封，容积调节活塞通过活塞杆以及固定在活塞杆上且位于容料筒外的联接板与弹性蓄能器相接触，弹性蓄能器固定在容料筒上。

3、根据权利要求 2 所述的连续塑化注射成型装置，其特征在于：所述导流通道的出口及容积调节环近容积腔一端都呈喇叭状。

4、根据权利要求 2 所述的连续塑化注射成型装置，其特征在于：所述容料筒的出口及注入筒的进口为相对应的喇叭状而相同形成单向阀的阀室，注入筒的喇叭状进口开有槽，阀室内有一活动的且可堵塞容料筒出口的球。

5、根据权利要求 2 所述的连续塑化注射成型装置，其特征在于：所述容料筒外包有加热元件。

6、根据权利要求 2 所述的连续塑化注射成型装置，其特征在于：所述弹性蓄能器是弹簧或气弹簧。

7、根据权利要求 1 所述的连续塑化注射成型装置，其特征在于：所述注入筒筒壁与注入芯棒之间留有可通过熔料的间隙。

连续塑化注射成型装置

（一）技术领域

本实用新型涉及一种注塑装置，尤其是一种将塑料原料连续挤压塑化熔融并将其注入到闭合模腔的注射成型装置。

（二）背景技术

现有的一般注塑成型机是一般采用的是往复螺杆式注射成型装置或预塑化柱塞式注射成型装置。

在往复螺杆式注射成型装置的工作循环原理为：塑料借助旋转螺杆沿着螺槽向前运动并成为熔融粘流状态，同时积聚压力推动螺杆向后退，当螺杆后退至计量值时，螺杆便停止转动等待到合模装置再一次合完模，借助油缸推力将前端储存熔料注出至模具内成型。由于上述的运动模式，带来了往复螺杆式塑化的固有缺陷：

1. 螺杆沿轴线运动，导致塑料颗粒运动不一致，轴向温差大,塑化过程不均一。
2. 螺杆间歇式工作，起动频繁，加速减速消耗能量，降低传动效率，削弱生产能力。
3. 螺杆的熔融过程为非稳定过程，难以对聚合物进行共混合金化处理，在熔融状态加添加剂，以及排气过滤等。

因此，采用往复式塑化成型装置的注塑机难以高质量低能耗的加工塑料制品。

而预塑化柱塞式注射成型装置的工作原理是：通过塑化螺杆预塑装置对塑料粒进行塑化熔融，熔料经单向阀而进入注入筒，当供料量达到计量值时，塑化螺杆停转，注入芯棒即进行注射。这种方法存在着：注入筒内滞料严重，清理不便；结构不紧凑；螺杆是间歇运转等缺点，是一个操作麻烦，并不经济的加工方法。

（三）发明内容

本实用新型的目的在于提供一种可连续塑化的注射成型装置。

为实现上述目的，本实用新型采用以下技术方案：

一种连续塑化注射成型装置，包括机座、预塑装置、单向阀和注入装置，预塑装置包括带加热结构的塑化筒、塑化螺杆和驱动装置，注入装置包括带加热结构的注入筒、注入芯棒和驱动装置，所述塑化筒与单向阀之间还设有一变容暂存装置，单向阀设在变容暂存装置与注入筒之间。

上述技术方案还可以通过以下技术措施作进一步改进。

所述变容暂存装置包括容料筒、导流芯棒、环状容积调节活塞、活塞杆、联接板和弹性蓄能器，导流芯棒位于容料筒内，导流芯棒内有一导流通道，导流通道的进口通过容料筒侧壁的进口与塑化筒相连通，导流通道的出口与容料筒的容料腔相连，容料腔通过容料筒的出口与单向阀相通，容积调节活塞可滑移地套在导流芯棒的出口端，并与导流芯棒及容料筒液密封，容积调节活塞通过活塞杆以及固定在活塞杆上且位于容料筒外的联接板与弹性蓄能器相接触，弹性蓄能器固定在容料筒上。所述导流通道的出口及容积调节环近容积腔一端都呈喇叭状。

所述容料筒的出口及注入筒的进口为相对应的喇叭状而相同形成单向阀的阀室，注入筒的喇叭状进口开有槽，阀室内有一活动的且可堵塞容料筒出口的球。

所述容料筒外包有加热元件。

所述弹性蓄能器是弹簧或气弹簧。

所述注入筒筒壁与注入芯棒之间留有可通过熔料的间隙。这样的结构可使熔料先进先出，不易滞留，且改变注入芯棒截面积可改变注射压强。

本实用新型结构简单合理，塑化质量好，生产效率高，控制方便且精度高，加工范围大，熔料在容料筒及注入筒内不易滞留。

（四）附图说明

图 1 为本实用新型的结构示意图;

图 2 为本实用新型处于注射计量阶段的前半部分剖视图;

图 3 本实用新型处于注射和保压阶段的前半部分剖视图。

（五）具体实施方式

下面结合附图和具体实施方式对本实用新型作进一步详细的说明。

如图所示，一种连续塑化注射成型装置是由机座 100， 一预塑装置 200， 一变容暂存装置 300， 一注入装置 400，以及一单向阀 500 所构成。

其中预塑装置的驱动装置 201 固定在机座 100 的平台 104 上，在驱动装置 201 输出端面固定有的塑化筒 202，塑化筒 202 内含有塑化螺杆 203，塑化螺杆 203 的尾部与驱动装置 201 的输出轴固定可作旋转运动，加热装置 204 包覆固定在塑化筒 202 外面，塑化筒 202 向左延伸一定长度后，用卡环 208 联结一个中间开孔的连接法兰 205，连接法兰 205 左端面与变容暂存装置 300 的容料筒 301 上开有孔的右端面固定联结。

容料筒 301 上半部分中间固定有一导流芯棒 303，导流芯棒 303 内有一 90 度的导流通道，导流通道与容料筒 301 的孔及连接法兰 205 的孔对应形成平滑流道 311 用于熔体流动，导流通道的下开口呈喇叭状，对应的是容料腔 312；在导流芯棒 303 与容料筒 301 之间夹有一可上下移动的环状容积调节活塞 302，容积调节活塞 302 的上端面与六根可上下活动的活塞杆 304 相接触，活塞杆 304 上端面固定联结在一块可上下活动的联接板 306 上；联接板 306 的上平面与弹性蓄能器 310 相联结，弹性蓄能器 310 在储料时收缩蓄能，在输料时弹性回复张开对容积调节活塞 302 施加压力向下运动缩小容料腔容积； 弹性蓄能器 310 固定在支承板 309 上，支承板 309 通过支柱 307 固定在容料筒 301 上；容料筒 301 的外面包有加热元件 305。

容料筒 301 的下端面与注入装置 400 的注入筒的后筒 408 开孔 413 的端面相联结，容料腔 312 通过容料筒 301 的下出口 504 与单向阀 500 相通，容料筒的喇叭出口 504 与后筒 408 的喇叭开口共同形成阀室 502， 后筒 408 的喇叭开口有槽 503 通熔体， 阀室 502 内有一可活动的球 501，在注射和保压阶段堵住出口 504。

在注入筒后筒 408 的左端固定联结有密封端盖 406， 端盖 406 的凸元伸进筒内，凸元的左端开进料槽与孔 413 接通；后筒 408 的左端与注入筒的前筒 410 相联结，前筒 410 的右半部分伸入后筒 408 内，并且其右端面与端盖 406 的端面压紧，并形成通熔体的环形室 414；在后筒 408 外包有加热元件 409，在前筒 410 外包有加热元件 411，可调节熔体注射温度；前筒 410 的左端联结注射嘴 415；可左右伸缩的注入芯棒 405 穿过端盖 406 上的孔伸入前筒的注射室 412 内，注入芯棒 405 与前筒 410 的筒壁有间隙；注入芯棒 405 的左端通过联结头 404 固定在驱动装置 401 的伸缩杆 403 上；驱动装置 401 通过联结杆 416 同端盖 406 固定，端盖 406 支于机座 100 的立柱 102 上，驱动装置 401 的右端面固定于机架的端面 103 上；在注射阶段，驱动装置推动注入芯棒将注射室前端的熔体通过注射嘴 415 的孔压入至模具型腔。

在不脱离本实用新型的设计方案原理情况下，可以以其它设计形式实现本实用新型，因此上述实施例只不过举例而不应解释为对本实用新型设计的限制，原理相同的所有设计变化均应落在本实用新型范围内。

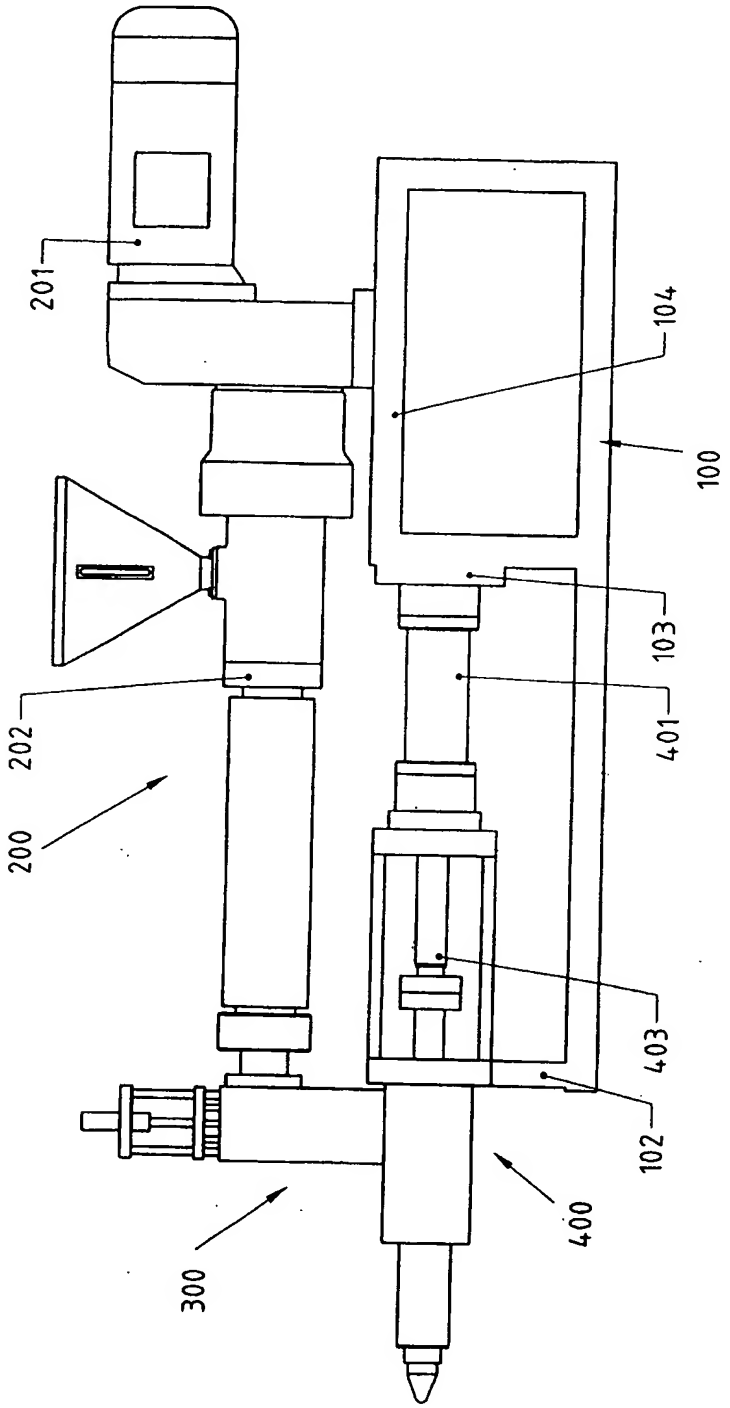

图 1

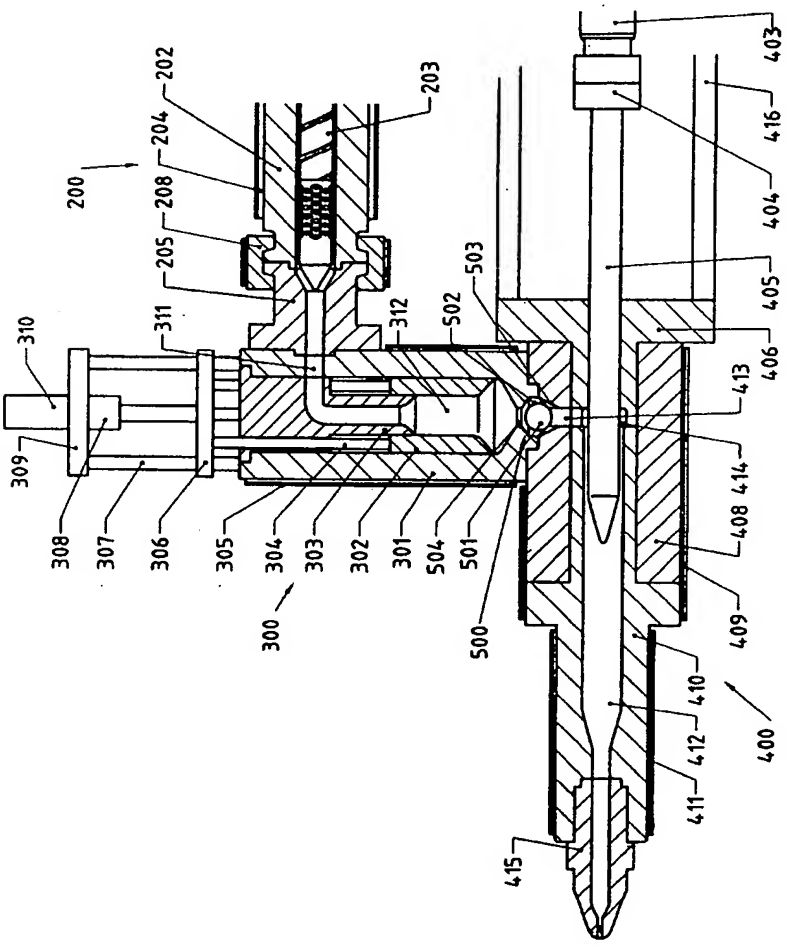
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图 2

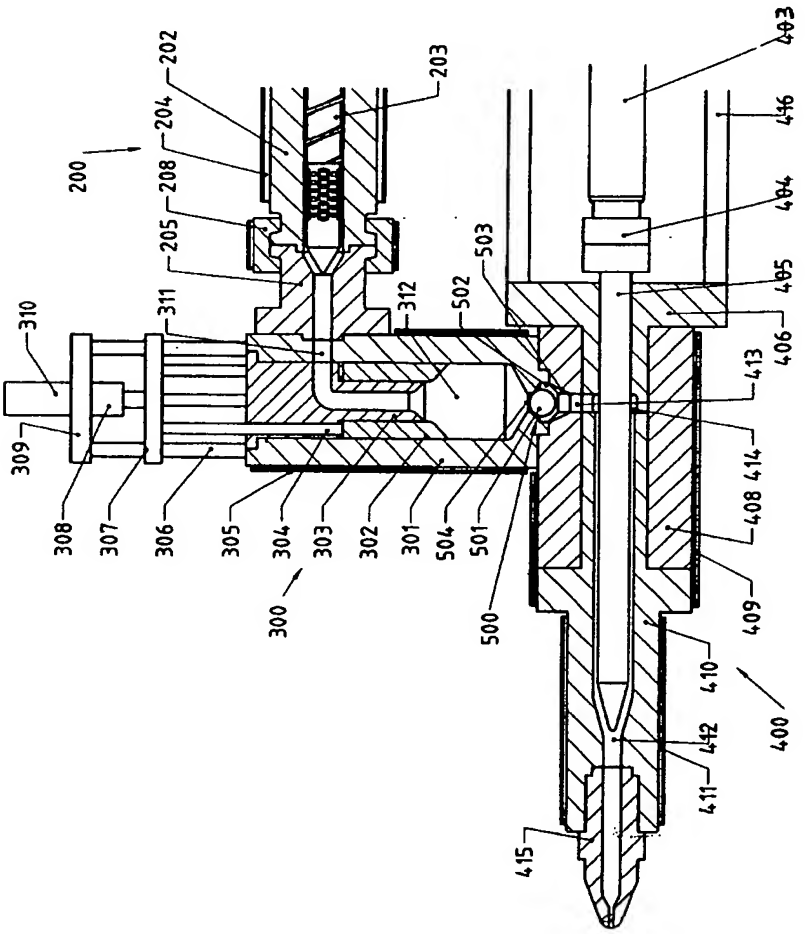
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图 3

Title: **A Continuous Plasticizing Injection Molding Apparatus**

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Abstract:
The utility model relates to an injection molding apparatus, particularly to injection molding apparatus which can continually extrude, plasticize and melt plastic materials, and then inject the materials into a closed cavity, comprising a base, a pre-plasticizing apparatus, a one-way valve and an injection apparatus; the said pre-plasticizing apparatus comprises a plasticizing canister with heating configuration, plasticizing screw and a driving apparatus; and the said injecting apparatus includes an injecting canister, an injecting mandril and a driving apparatus. There is a mutative-capacity temporary storage apparatus between plasticizing canister and one-way valve, and the one-way valve is provided between temporary storage apparatus and injecting canister.

Claims:

1. A continuous plasticizing injection molding apparatus comprising: a base, a pre-plasticizing apparatus having a plasticizing canister with a heating construction, a plasticizing screw and a driving apparatus, one-way valve and injection apparatus having an injection canister with a heating structure, an injection mandril and a driving apparatus, wherein a mutative-capacity and temporary storage apparatus is provided between said plasticizing canister and said one-way valve, especially, wherein said one-way valve is provided between said mutative-capacity temporary storage apparatus and said injection canister.

2. A continuous plasticizing injection molding apparatus as described in Claim 1, wherein the said mutative-capacity temporary storage apparatus comprises a material canister, a guide melt mandril, an adjustive cubage piston ring, a piston bar, a connection board and a flexible storage instrument, the said guide melt mandril is located in the material canister, there is a guide melt passage in the guide melt mandril, the entrance of the guide melt passage is connected to the plasticizing canister through an entrance at the side of the melt canister, the exit of the guide melt passage is connected to the melt cavity of the melt canister, and the melt cavity is connected with the one-way valve through

the exit of the melt canister, the cubage adjustive piston can sheath movably on the exit end of the guide melt mandril, pressurizing with guide melt bar and the liquid in the material canister; the adjustive cubage piston is connected with a stretch storage instrument through said piston bar and said connection board fixed in the piston bar and outside of the melt canister, and the stretch storage instrument is fixed on the melt canister.

3. A continuous plasticizing injection molding apparatus as described in Claim 2, wherein the said exit of the guide melt passage and the end of the cubage adjustive ring closing to the melt cavity appears tubaeform.

4. A continuous plasticizing injection molding apparatus as described in Claim 2, wherein the exit of said melt canister and the entrance of said injection canister form two corresponding tubaeform, and then form one valve chamber of said one-way valve; the tubaeform entrance of injection canister has a groove; there is an active ball in the valve chamber, which can stifle the exit of the melt canister.

5. A continuous plasticizing injection molding apparatus as described in Claim 2, particularly, a heater encasing of the melt materials canister.

6. A continuous plasticizing injection molding apparatus as described in Claim 2, wherein the said flexible storage instrument is a spring or a pneumatic spring.

7. A continuous plasticizing injection molding apparatus as described in Claim 1, wherein there is a clearance between the side of the said injection canister and injection mandril which the melt material can pass through.

Description:

A Continuous Plasticizing Injection Molding Apparatus

FIELD OF TECHNOLOGY

The utility model relates to an injection molding apparatus and more particularly to an injection molding apparatus, which can extrude, plastify and melt continuously plastic materials and then inject the materials into a closed cavity.

BACKGROUND

In the prior art, general injection molding apparatus adopts reciprocating type screw injection molding apparatus or pre-plasticizing pillar piston injection molding apparatus.

The circulatory principle of reciprocating type screw injection molding apparatus is that: plastic moves forward depending on the rolling screw along the groove of the screw, and becomes melted and ropy consistency, at the same time, accumulates pressure to push the screw move backward; when the screw move backward to reach the measure value, the screw stops running until the molding apparatus finishes the molding again, then injects the front melt stored into the mold for molding in virtue of oilcan thrust. The above-stated movement mode causes the immanent deficiencies of reciprocating type screw plasticizing as follows:

1. the screw moves along the axes, causing inconsistency of movements of plastic grain, great difference in temperature along the direction of axes and heterogeneous plasticizing process;
2. the screw works on an intermittent basis and is started up too often, consuming energy at the time of initiation and finishing, reducing the driving efficiency, and weakening the throughput; and
3. the process of melting is a non stable process. It is difficult to conduct a co-mixture metalization process on polymer, adding additive at melting status, and exhausting and filtering etc.

Therefore, it is difficult for the plastic injection adopting reciprocating type plasticizing molding apparatus to process plastic materials with high quality and low energy-consumption.

The circulatory principle of injection molding apparatus by means of pre-plasticizing pillar piston is that: the plastic grains are plasticized and melted, through plasticization screw pre-plasticizing device, and the melted materials enter into the injection canister passing through a one-way valve;

when the feed reaches the measure value, plasticizing screw stops rolling, and injection mandril begins to inject. This method has the following deficiencies: the problem of blocking materials is serious, difficulty of cleaning up; the configuration is not tight; the interval of running of screw. The process is operatively troublesome and is not cost-effective.

SUMMARY OF INVENTION

The objective of the utility model is to provide a continuous plasticizing injection molding apparatus.

In order to achieve the above objective, the present utility model adopts the following technical solutions:

A continuous plasticizing injection molding apparatus comprising: a base; a pre-plasticizing apparatus having a plasticizing canister with a heating construction, a plasticizing screw and a driving apparatus; one-way valve and injection apparatus having an injection canister with a heating construction, an injection mandril and a driving apparatus; wherein a mutative-capacity temporary storage apparatus is provided between said plasticizing canister and said one-way valve, and said one-way valve is provided between said mutative-capacity and temporary storage apparatus and said injection canister.

The above technical solution can be improved through the technical means as follows:

The said mutative-capacity temporary storage apparatus comprises a material canister, a guide melt mandril, an adjustive piston of ring cubage, a piston bar, a connection board and a flexible storage instrument, the said guide melt mandril is located in the material canister, there is a guide melt passage in the guide melt mandril, the entrance of the guide melt passage is connected to the plasticizing canister through on entrance at the side of the melt canister, the exit of the guide melt passage is connected to the melt cavity of the melt canister, and the melt cavity is connected with the one-way valve through the exit of the melt canister, the cubage adjustive piston is sheath movably on the exit end of the guide melt mandril, pressurizing with guide melt bar and the liquid in the material canister; the cubage adjustive piston is connected with a stretch storage instrument through said poison bar and said connection board fixed in the poison bar and outside of the melt canister, and the stretch storage instrument is fixed on the melt canister. The said exit of the guide melt passage and the end of cubage adjustive ring closing to the melt cavity appears tubaeform.

The exit of said melt canister and the entrance of said injection canister form two corresponding tubaeform parts, and then form one valve chamber of said one-way valve; the tubaeform entrance of injection canister has a groove; there is a moveable ball in the valve chamber, which can block the

exit of the melt canister.

The said melt canister is covered by heating elements outside.

The said flexible storage instrument is a spring or a pneumatic spring.

There is a clearance between the wall of the said injection canister and injection mandril, which the melt material can pass through. Such structure enables a first-in, first-out effect, and the melted materials pass freely make the melt materials "first in, first out", and not easy to be detained. Furthermore, the injection pressure can be changed by changing the sectional area of the mandril.

The present utility model has the following advantages: a simple and reasonable structure, good quality of plasticization with high production efficiency, easy to control, good precision standard; a large range of processing; and the melted materials flow easily through the melt canister and injection canister.

BRIEF DECRIPTION OF DRAWINGS

FIG. 1 is a structural schematic drawing of the present utility model;

FIG. 2 is a sectional view of the forepart when the present utility model is in the phase of injecting and measuring;

FIG. 3 is a sectional view of the forepart when the present utility model is in the phase of injecting and keeping pressure.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The present utility model is described in details with the appended drawings and the following preferred embodiments.

As shown in the Figures, a continuous plasticizing injection molding apparatus includes a base 100, pre-plasticizing apparatus 200, mutative-capacity temporary storage apparatus 300, injection apparatus 400, and one-way valve 500.

Wherein, the driving device 201 of the pre-plasticizing apparatus is fixed on the platform 104 of the base 100, the plasticization canister 202 is fixed in the output end of driving device 201. Plasticization canister 202 includes plasticization mandril 203 inside, and the end of plasticization mandril 203 and the output axes of driving device 201 can rotate. The heater 204 covers and is fixed outside of the plasticization canister 202, which can be connected to a joint flange 205 having a hole in the middle through a block 208 after it extends to the left. The left end of the joint flange 205 connects

with the right end of the melt materials 301 in the mutative-capacity and temporary storage apparatus 300 with having a hole.

One guide melt mandril 303 having a 90° guide melt passage is fixed on the middle of the fore half of melt materials canister 301, and the guide melt passage, the hole in the melt materials canister 301 and the hole connected to the joint flange 205 are corresponding to form a flowing passage 311 for the flow of melting materials. The lower exit of the guide passage shows tubaeform parts corresponding to the melting materials cavity. One ringed movable piston 302 for adjusting cubage is sandwiched between guide melt mandril 303 and melting materials canister 301, and the top plane of the joint board 306 is connected to the flexible storage instrument 310. The flexible storage instrument 310 has a retraction function, which means that the flexible reversion brings pressure to bear on the adjustive cubage piston to move down for reducing the cubage of melting materials cavity. The flexible storage instrument 310 is fixed on the suspending board 309, fastered on the melting materials canister 301 through suspending pole 307. There folds a heater 305 outside of the melt materials canister.

The bottom surface of the melting materials canister 301 is connected with the surface of the hole 413 located in the back canister 408 of injecting apparatus 400. The melting materials cavity 312 is connected to the one-way valve 500 through the downward exit 504 of melting materials canister 301, and the tubaeform exit 504 of the melting materials canister together with the tubaeform opening of back canister 408 form the valve 502. There is a groove 503 in the tubaeform opening of the back canister 408 opening into the melting cavity. There is a movable ball 501 in the valve cavity 502, which can block the exit 504 during the procedure of injecting and maintaining pressure.

There is a sealed end cover 406 fixed and connected to the left end of back canister 408 of the injecting canister. The bulge of end cover 406 puts into the said canister, and there is an entrance of entering materials in the left end of the bulge put through the hole 413. The left end of the back canister 408 connects with the front canister 410, the right part of which put into the back canister 408, and its right end cover impacts the plane of the end cover 406 to form the annular cavity 414 of passing the melting materials. There heater 409 encases back canister 408, and there is a heater 411 outside of front canister 410, which can adjust the temperature of injecting melt materials. The left end of the front canister 410 connects with injection nozzle 415. The injecting mandril 405, which may be adjustable left and right, passing through the hole in the end cover 406, puts into the injection cavity 412 of the front canister, and there is clearance between injection mandril 405 and the CLIFF of front canister 410. The left end of injection mandril 405 is fixed on the flexible pole 403 of the driving device 401 through joint head 404; driving device 401 is fixed with the end cover 406

through joint pole 416; the end cover 406 is sustained on the upright column 102 of the base 100; the right end plane of the driving device 401 is fixed on the end plane 103 of the basic frame; during the process of injecting, the driving device pushes the injection mandril to pressure the melting materials in the front of injection cavity into to the mould cavity through injection nozzle 415.

It will be understood that the present utility model can be realized by other design forms without deviating from the principle of technical solution of the present utility model. Therefore the above embodiments are just the examples of the present utility model and should not be interpreted as the limitation to the present utility model. All modifications within the principle should fall into the protection scope of the present utility model.